What is claimed is:

1. An electronic circuit for bidirectional conversion of a high input voltage to a direct-current output voltage with indirect coupling, comprising:

a primary converter;

a common transformer; and

a secondary converter,

wherein the primary converter includes at least three primary converter sections connected in series, the output lines of which are each connected to a respective one of a plurality of transformer primary windings.

2. The circuit of claim 1, wherein the at least three primary converter sections are each formed by one input four-quadrant regulator, at least one intermediate circuit capacitor and one half bridge.

3. The circuit of claim 2, wherein each transformer primary winding is allocated one resonance capacitor.

4. The circuit of claim 3, wherein each transformer primary winding is allocated one series resonance capacitor that forms an oscillating circuit with a leakage inductance coil of the common transformer.

5. The circuit of claim 4, wherein between the primary converter sections the oscillating circuit has a relatively high efficient decoupling impedance.

6. The circuit of claim 4, wherein a resonance frequency of the oscillating circuit is higher or equal to a switching frequency that occurs with the at least three primary converter sections and that is produced by the half bridge.

7. The circuit of claim 1, wherein the high input voltage is one of an alternating-current and a direct-current voltage, the primary converter being connected in series or parallel depending on the height of the input voltage.

8. The circuit of claim 4, wherein a resonance circuit comprising the common transformer and a capacitor array is provided, the capacitor array having a symmetrical magnetic and electric structure for lossless switching operation, wherein the transformer, the capacitor array, and a respective resonance frequency and switching frequency are selected such that each of the primary converter sections are decoupled.

9. The circuit of claim 8, wherein the respective switching frequency of semiconductor switching elements is at least 1.2 times smaller than the resonance frequency.

10. The circuit of claim 8, wherein at a given resonance frequency, a ratio of impedances of the leakage inductance coil to the capacitor array is chosen so that an effective value of the alternating voltage of the capacitor in nominal operation is at least 1/3 of the no-load voltage of a transformer of a primary winding.

11. The circuit according to claim 8, wherein mutual coupling of the transformer primary windings and their coupling to the common secondary winding is a symmetrical magnetic coupling which is achieved in that the respective transformer primary windings have the same magnetic design and are arranged in the shape of discs between two of the n+ 1 secondary part windings that are connected in parallel or in series and that are linked to a secondary converter system which is provided with a direct-current output voltage intermediate circuit.

12. The circuit of claim 8, wherein control of the circuit is devised in such a manner that residual asymmetries of the resonance circuit are compensated by a control which is performed by way of a mains four-quadrant regulator.

13. The circuit of claim 12, wherein a superimposed intermediate circuit voltage control is realized by the four-quadrant regulator of the respective one of the primary converter sections, the intermediate circuit voltage control compensating a static residual asymmetry of the resonance circuit so that the intermediate circuit voltages of the primary converter sections can differ.

14. The circuit according to claim 1, wherein the transformer primary converter and the secondary converter may be operating synchronism and in the resonant mode of operation, wherein, in a feed mode of operation, only semiconductor switches of half bridges are clocked, whereas in recuperation mode of operation, only semiconductor switches of the secondary converter are clocked.

15. The circuit according to claim 2, wherein a full bridge is utilized instead of the half bridge.

16. The circuit according to claim 12, wherein the circuit may be operated in such a manner that, in case of failure in one of the primary converter sections, the defective converter section is set out of operation by way of mechanical switches and that the remaining n-1 primary converter sections are capable of taking over operation of the circuit.

17. The circuit according to claim 1, wherein the circuit is designed in such a manner that the at least three primary converter sections of the same

kind are operated directly from an AC mains through a switch and an input filter.

18. The circuit according to claim 1, wherein at low direct-current input voltages the direct-current input voltage is connected directly to an output of the second converter by way of a switch.

19. The circuit of claim 1, wherein in order to achieve a uniform resonance circuit impedance, one additional inductance coil is provided in series with each transformer primary winding.

20. The circuit of claim 17, the input filter is designed as a choke.

21. The circuit of claim 1, wherein the electric circuit is for use in a power supply system for rail vehicles.

22. The circuit of claim 8, wherein the respective switching frequency of semiconductor switching elements is at least 1.4 times smaller than the resonance frequency.

23. The circuit of claim 10, wherein at a given resonance frequency, a ratio of impedances of the leakage inductance coil to the capacitor array is chosen so that an effective value of the alternating voltage of the capacitor in nominal operation is 1/2 of the no-load voltage of a transformer of a primary winding.